

Application No. 09/323,230

REMARKSStatus of the claims:

With the above amendment claim 1 has been amended. Claims 1 and 6-9 are pending and ready for further action on the merits. No new matter has been added by way of the above amendment. The amendment to claim 1 has support at page 6, lines 13-15. It is believed that because the scope of amended claim 1 falls within the scope of the pre-amended claim 1 that the Examiner has already done a complete examination of amended claim 1. Accordingly, entry of the amendment and reconsideration in light of the following comments is respectfully requested.

Rejections under 35 USC §103

Claims 1 and 6-9 remain rejected under 35 USC §103(a) as being unpatentable over Tachikawa '255 (US Patent No. 4,356,255) combined with Aoai '686 (US Patent No. 5,252,686). This rejection is traversed for the following reasons.

Removal of Tachikawa '255

The Examiner's attention is drawn to the object of the present invention mentioned on page 1, line 11 to page 2, line 22, particularly page 2, lines 13 -16. As stated in this passage, one of the objectives of the present invention is to

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improve the resolution to the level of 0.25  $\mu\text{m}$ , (see Table 1, at page 15) without lowering other resist performances. Recently, it has been discovered that the resolution at a level of 0.25  $\mu\text{m}$  is very important, in the production of semiconductors made from silicone wafers. The inventors of the present invention have discovered that such a high resolution can be attained by following the claimed invention.

The Examiner's attention is also drawn to the disclosure of Tachikawa '255, wherein there is neither a description nor any suggestion that the addition of a quinone compound such as thioxanthone or the like improves the resolution of the photosensitive composition.

Finally, the Examiner is invited to consider the date of Tachikawa '255, which issued on October 26, 1982, almost 20 years ago. In 20 years, the resolution required in the production of semiconductor has drastically changed. 20 years ago, semiconductors on the order of 1  $\mu\text{m}$  resolution were common (and considered good). Therefore, although the disclosure of Tachikawa '255 describes a process "useful for the production of photoresists for IC", and the like, the disclosure of Tachikawa '255 does not remotely suggest that the addition of a quinone compound attains the resolution at a level of 0.25  $\mu\text{m}$ .

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Since Tachikawa '255 does not suggest that the addition of a quinone compound such as thioxanthone or the like improves the resolution, an artisan of ordinary skill would not be motivated to use the photosensitive composition of Tachikawa '255. The photosensitive composition of Tachikawa '255 is coated on PET or a similar substrate. There is no suggestion to coat the resist composition on a silicone wafer for producing a semiconductor in which high resolution at a level of 0.25  $\mu\text{m}$  is required.

Therefore, Tachikawa '255 cannot render obvious the present invention.

Removal of Aoai '686, and the combination of Aoai '686 and Tachikawa '255

Aoai '686 fails to make up these deficiencies. The quinonediazide compound disclosed in Aoai '686 is a condensate of a siloxane polymer and an orthoquinonediazide group. (See column 5, lines 16-19, column 193-194, etc. in Aoai '686). The siloxane polymer does not contain a phenolic hydroxyl group as is claimed in the instant invention. (See the abstract, etc. in Aoai '686). Therefore, the quinonediazide compound in Aoai '686 is totally different from the o-quinonediazide sulfonic acid ester of a compound having a phenolic hydroxyl group of the present invention.

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Moreover, the positive resist composition (positive working light sensitive composition) disclosed in Aoai '686 is for producing a multilayered resist system, which is not the resist system of the present invention or of Tachikawa '255 (see, column 3, lines 30-64). Since the use of the resists as well as the components (radiation sensitive components) of the resists are totally different in Aoai '686 and in the present invention, the artisan of ordinary skill would not easily surmise that the addition of thioxanthone, as disclosed in Aoai '686, would give the unexpectedly advantageous features in such a resist composition seen in the present invention. Accordingly, Applicants submit that the present invention is unobvious over Aoai '686. The Examiner should also note that there is neither description nor suggestion in Aoai '686 that addition of thioxanthone attains such a high resolution as 0.25  $\mu\text{m}$ .

Since the use of these resists as well as the components (radiation sensitive component) of resists are totally different in Aoai '686 and in Tachikawa '255, the artisan of ordinary skill would not be motivated to combine Aoai '686 and Tachikawa '255. For these reasons, Applicants submit that the combination of Aoai '686 and Tachikawa '255 can not render obvious the present invention.

Finally, Applicants submit that even if one were to combine the widely disparate references disclosed above, the instant

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invention shows unexpected advantageous features that could not be surmised by the teachings of Aoai '686 and Tachikawa '255. (i.e., the addition of thioxanthone attains a resolution to 0.25  $\mu\text{m}$ ). For the above reasons, Applicants assert that the rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

If any questions remain regarding the above matters, please contact Applicant's representative, Andrew D. Meikle, in the Washington metropolitan area at the phone number listed below.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a two (2) month extension of time for filing a reply in connection with the present application, and the required fee of \$400.00 is attached hereto.

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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH &amp; BIRCH, LLP

By  \_\_\_\_\_

Andrew D. Meikle, #32,868

ADM/TBS/crt

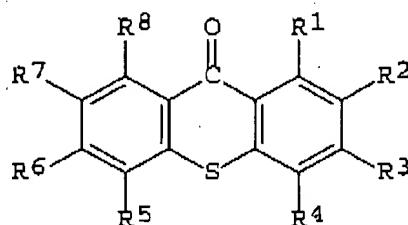
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VERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE CLAIMS:

Claim 1 has been amended as follows:

1. (Amended) An article comprising a substrate comprising a silicon wafer and a positive resist composition comprising a novolac resin[,]; an o-quinonediazide sulfonic acid ester of a compound having a phenolic hydroxyl group; [a radiation-sensitive quinonediazide compound] and a thioxanthone compound represented by the following formula(I):



( I )

wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup> independently represent hydrogen, halogen, alkyl, alkoxy, aryl, carboxyl or alkoxycarbonyl [wherein the positive resist composition is coated on the surface of the silicon wafer].

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<b>Phone:</b>	703-308-2298	<b>Pages:</b>	10 (including cover sheet)
<b>Your Ref.:</b>	09/323,230	<b>Our Ref.:</b>	2185-0343P
<b>Re:</b>		<b>CC:</b>	

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**Comments:**    **Attached, please find a proposed after final response. Please note that the word "or" has been changed to "of" in the third line of claim 1 as we discussed in our phone conversation.**